malfunction-information managing object.

Furthermore, in place of the above object oriented self-diagnosis program, there may be provided an object oriented self-diagnosis program including at least one malfunction-information storing object that stores malfunction information of the each one of the at least one diagnosis target determined based on the result of the malfunction detection operation of the each one of the at least one diagnosis target in view of a level of malfunction of the each one of the at least one diagnosis target, and a malfunction-information managing object that commands the at least one malfunction-information storing object to store the malfunction information of the each one of the at least one diagnosis target based on the result of the malfunction detection operation of the each one of the at least one diagnosis target. The malfunction-information managing object may output MIL information for controlling the at least one MIL based on the malfunction information of the each one of the at least one diagnosis target stored by the at least one malfunction-information storing object. The object oriented self-diagnosis program may further include an MIL controlling object for controlling the at least one MIL based on the MIL information outputted from the malfunction-information managing object.

## BRIEF DESCRIPTION OF THE DRAWINGS

The invention, together with additional objectives, features and advantages thereof, will be best understood from

the following description, the appended claims and the accompanying drawings in which:

FIG. 1 is a schematic view of an engine control system according to an embodiment of the present invention;

FIG. 2 is a block diagram showing a structure of an engine control unit of the engine control system according to the embodiment;

FIG. 3 is a schematic view showing a structure of a self-diagnosis program;

FIG. 4 is a MSC showing a procedure of MIL control operation;

FIG. 5 is a schematic view showing information stored by each malfunction-information storing object;

FIG. 6 is a flowchart showing an MIL response process;

FIG. 7 is a flowchart showing an MIL information output process; and

FIG. 8 is a flowchart showing a control instruction output process.

## DETAILED DESCRIPTION OF THE INVENTION

An embodiment of the present invention will be described with reference to the accompanying drawings.

FIG. 1 is a diagram showing an entire structure of an engine control system. The engine control system includes an engine 11 and an engine control unit 16 that controls the engine 11. The engine control unit 16 corresponds to "a vehicular control device" of the present invention.

Intake air is supplied to the engine 11 from an air cleaner through an intake air pipeline 12. An air flow sensor 13 for measuring an intake air flow and an intake air temperature sensor 14 for measuring an intake air temperature are provided in the intake air pipeline 12. Furthermore, a throttle valve 15 driven by an accelerator pedal is provided in the intake air pipeline 12.

The engine control unit 16 receives various signals indicative of a state of the engine 11. These signals include an intake air flow signal of the air flow sensor 13 indicative of an intake air flow, a throttle valve position signal of a throttle sensor 17 indicative of a throttle valve position of the throttle valve 15, an air-fuel ratio (A/F) signal of an air-fuel ratio sensor 18 indicative of an oxygen concentration in exhaust gas, a battery voltage signal of a battery 19, a water temperature signal of a water temperature sensor 20, a rotational angle signal of a distributor 21 that is driven by the engine 11 and a cylinder identification signal of the distributor 21.

The engine control unit 16 controls an operation of the engine 11. Specifically, the engine control unit 16 computes a fuel injection amount of each cylinder of the engine 11 in consistent with the current state of the engine 11 based on the above signals and outputs a fuel injection signal to each injector 22a, 22b, 22c, 22d provided to each corresponding cylinder. Furthermore, the engine control unit 16 outputs an ignition signal to an igniter 23.

The engine control unit 16 also diagnoses various